III. IN THE CLAIMS

1. (original) A method for providing a predetermined service on a portion of a point-to-point communication link, the method comprising:

receiving a request from a remote client device on a first network device over a first communication link, where the request corresponds to establishment of a point-to-point communication link between the remote client device and a second network device;

forwarding the request from the remote client device to the second network device from the first network device over a second communication link;

transmitting a service capability parameter from the first network device to the second network device, where the service capability parameter indicates that the first network device is capable of supporting the predetermined service;

negotiating the point-to-point communication link between the remote client device and the second network device, where the second network device, based on the service capability parameter, permits the remote client device to negotiate the predetermined service on the point-to-point communication link;

sending a negotiated service parameter from the second network device to the first network device, where the negotiated service parameter indicates that the predetermined service applies to the point-to-point communication link;

establishing the point-to-point communication link between the remote client device and the second network device, where the point-to-point communication link includes the first communication link between the remote client device and the first network device; and

providing the predetermined service between the remote client device and the first network device on the first communication link.

2. (original) The method of claim 1, where the predetermined service further comprises a computationally intensive service.

3. (original) The method of claim 2, where the computationally intensive service further comprises compression and the step of providing the predetermined service between the remote client device and the first network device on the first communication link further comprises the steps of:

receiving a first compressed packet from the remote client on the first network device over the first communication link;

decompressing the first compressed packet on the first network device; and

forwarding the decompressed packet to the second network device.

4. (original) The method of claim 3, where the step of providing the predetermined service between the remote client device and the first network device on the first communication link further comprises the steps of:

receiving an uncompressed packet from the second network device in the first network device on the second communication link;

compressing the uncompressed packet in the first network device to form a second compressed packet; and

forwarding the second compressed packet to the remote client device from the first network device on the first communication link.

5. (original) The method of claim 2, where the computationally intensive service further comprises encryption and the step of providing the predetermined service between the remote client device and the first network device on the first communication link further comprises the steps of:

receiving a first encrypted packet from the remote client in the first network device over the first communication link;

decrypting the first encrypted packet in the first network device; and

forwarding the decrypted packet to the second network device.

6. (original) The method of claim 5, where the step of providing the predetermined service between the remote client device and the first network device on the first communication link further comprises the steps of:

receiving an unencrypted packet from the second network device in the first network device;

encrypting the unencrypted packet in the first network device to form a second encrypted packet; and

forwarding the second encrypted packet to the remote client device from the first network device on the first communication link.

7. (original) The method of claim 1, where the first communication link further comprises a communication path through a first communication network and the second communication link further comprises a communication path through a second communication network.

8.   (original)   The method of claim 7, where the first communication link further comprises a circuit switched path through a public switched telephone network and the second communication link further comprises a virtual path through a packet switched computer network.

9.   (original)   The method of claim 1, where the point-to-point communication link further comprises a tunnel communication link.

10.   (original)   The method of claim 9, wherein the tunnel communication link comprises one of a Layer 2 Tunneling Protocol (L2TP) connection and a Point-to-Point Tunneling Protocol connection.

11.   (original)   The method of claim 1, where the service capability parameter is encoded in a first Attribute Value Pair (AVP) format and the negotiated service parameter is encoded in a second AVP format.

12.   (original)   The method of claim 1, where the first network device further comprises a tunnel initiator and the second network device further comprises a tunnel endpoint.

13.   (original)   The method of claim 12, where the tunnel initiator further comprises a Level 2 Tunneling Protocol Access Concentrator (LAC) and the tunnel endpoint further comprises a Level 2 Tunneling Protocol Network Server (LNS).

14.   (cancelled without prejudice) A method for providing at least one computational service on a communication link, the method comprising:

detecting a call associated with at least one remote client device in communication with a first network device over a first communication link;

establishing a point-to-point communication link from the first network device to a second network device over a second communication link responsive to detecting the call associated with the remote client device in communication with the first network device;

transmitting a connection connect message from the first network device to the second network device, the connection connect message comprising at least one computational service capability parameter associated with the first network device;

negotiating computational service parameters with the remote client device from the second network device responsive to receiving the connection connect message comprising the at least one computational service capability parameter associated with the first network device;

forming a computational service set up request message on the second network device, the computational service set up request message comprising the computational service parameters negotiated with the second network device;

transmitting the computational service set up request message from the second network device to the first network device;

implementing the computational service parameters received from the second network device on a computational service engine associated with the first network device responsive to receiving the computational service set up request message on the first network device;

forming a computational service set up reply message on the first network device, the

computational service set up reply message comprising a computational service implementation status parameter; and

transmitting the computational service set up reply message from the first network device on the second computer network to the second network device.

15.   (cancelled without prejudice) A computer readable medium having stored therein instructions for causing a processor to execute the method of claim 14.

16.   (cancelled without prejudice) The method of claim 14, wherein the connection connect message comprises an Incoming Call Connect (ICCN) message or an Outgoing Call Connect message (OCN) message.

17.   (cancelled without prejudice) The method of claim 14, wherein the at least one computational service capability parameter associated with the first network device is encoded in an Attribute Value Pair (AVP) format.

18.   (cancelled without prejudice) The method of claim 14, wherein the computational service parameters negotiated with the tunnel client device in the computational service set up request message are encoded in a Attribute Value Pair (AVP) format.

19.   (cancelled without prejudice) The method of claim 14, wherein the computational service implementation status parameter is encoded in an Attribute Value Pair (AVP) format.

20.   (cancelled without prejudice) The method of claim 14, wherein the point-to-point communication link comprises a tunnel communication link.

21.   (cancelled without prejudice) The method of claim 20, wherein the tunnel communication link comprises one of a Layer 2 Tunneling Protocol (L2TP) communication link and a Point-to-Point Tunneling Protocol communication link.

22.   (cancelled without prejudice) The method of claim 14, wherein the first network device comprises a tunnel initiator network device, and the second network device comprises a tunnel endpoint network device.

23.   (cancelled without prejudice) The method of claim 14, wherein the computational service comprises a computationally intensive service.

24.   (cancelled without prejudice) The method of claim 23, wherein the computationally intensive service comprises a compression service.

25.   (currently amended) A method for providing at least one computational service on a communication link, the method comprising:

        detecting a call associated with at least one remote client device in communication with a first network device over a first communication link;

        establishing a point-to-point communication link from the first network device to a second network device over a second communication link responsive to detecting the call

associated with the remote client device in communication with the first network device;

transmitting a connection connect message from the first network device to the second network device, the connection connect message comprising at least one computational service capability parameter associated with the first network device;

negotiating computational service parameters with the remote client device from the second network device responsive to receiving the connection connect message comprising the at least one computational service capability parameter associated with the first network device;

forming a computational service set up request message on the second network device, the computational service set up request message comprising the computational service parameters negotiated with the second network device;

transmitting the computational service set up request message from the second network device to the first network device;

implementing the computational service parameters received from the second network device on a computational service engine associated with the first network device responsive to receiving the computational service set up request message on the first network device;

forming a computational service set up reply message on the first network device, the computational service set up reply message comprising a computational service implementation status parameter; and

transmitting the computational service set up reply message from the first network device on a second computer network to the second network device.

wherein the computational service comprises a computationally intensive service;

and wherein the computationally intensive service comprises a compression service;

~~The method of claim 24,~~ and further comprising:

receiving compressed packets on the first network device from the remote client device over the first communication link;

decompressing the compressed packets on the computational service engine prior to transmitting the packets on the communication link to the second network device; and

transmitting the decompressed packets from the first network device to the second network device on the second communication link.

26.   (original)   The method of claim 25, further comprising:

receiving uncompressed packets on the first network device from the second network device on the second communication link;

compressing the received uncompressed packets on the computational service engine prior to transmitting the packets on the first computer network to the remote client device; and

transmitting the compressed packets from the first network device over the first communication link to the remote client device.

27.   (cancelled without prejudice) The   method   of   claim   24,   wherein   the computationally intensive service comprises an encryption service.

28.   (cancelled without prejudice) The   method   of   claim   14,   further   comprising, disabling the at least one computational service on the communication link.

29.   (cancelled without prejudice) The   method   of   claim   28,   wherein   the   step   of disabling the at least one computational service on the communication link comprises:

forming a second computational service set up request message on the second network device, the second computational service set up request message comprising a computational service termination request parameter;

transmitting the second computational service set up request message from the second network device to the first network device;

forming a second computational service set up reply message on the first network device upon receiving the second computational service set up request message on the first network device, the second computational service set up reply message comprising a computational service termination status parameter; and

transmitting the second computational service set up reply message from the first network device to the second network device.

30.   (cancelled without prejudice) The method of claim 29, wherein the computational service termination request parameter and the computational service termination status parameter are encoded in an Attribute Value Pair (AVP) format.

31.   (cancelled without prejudice) The method of claim 14, further comprising:

detecting a computational service error on the computational service engine;

forming a computational service reset message on the first network device; and

transmitting the computational service reset message from the first network device to the remote client device.

32.   (cancelled without prejudice) The method of claim 14, further comprising:

detecting a packet error associated with packets received from the first network device on the second network device over the point-to-point communication link;

forming an error detection message on the second network device, the error detection message comprising an error detection parameter; and

transmitting the error detection message from the second network device to the first network device.

33.   (cancelled without prejudice) The method of claim 32, wherein the error detection parameter comprises a reset parameter encoded in an Attribute Value Pair format.

34.   (cancelled without prejudice) The method of claim 33, further comprising:

forming a computational service reset request message on the first network device, the computational service reset request message comprising a computational service reset parameter; and

transmitting the computational service reset request message from the first network device to the remote client device.

35.   (cancelled without prejudice) A communication system for offloading at least one computational service on a portion of a point-to-point communication link, the system comprising:

a first network device communicating with at least one remote client device over the first communication link, the first network device further coupled to a second communication link, the first network device configured to establish the point-to-point communication link with a

second network device and transmit a connection connect message over the second communication link, the connection connect message comprising at least computational service capability parameter associated with at least one computational service mechanism available on a computational service engine associated with the first network device, wherein the point-to-point communication link includes the first communication link and the second communication link; and

the second network device coupled to the second communication link and configured to receive the connection connect message from the first network device, and responsive thereto,

negotiate computational service parameters with the at least one remote client device;

form a computational service set-up request message comprising at least one negotiated computational service parameter; and

transmit the computational service set-up request message on the second computer network.

36. (currently amended) <u>A communication system for offloading at least one computational service on a portion of a point-to-point communication link, the system comprising:</u>

<u>a first network device communicating with at least one remote client device over the first communication link, the first network device further coupled to a second communication link, the first network device configured to establish the point-to-point communication link with a second network device and transmit a connection connect message over the second communication link, the connection connect message comprising at least computational service capability parameter associated with at least one computational service mechanism available on a</u>

computational service engine associated with the first network device, wherein the point-to-point communication link includes the first communication link and the second communication link; and

the second network device coupled to the second communication link and configured to receive the connection connect message from the first network device, and responsive thereto,

negotiate computational service parameters with the at least one remote client device;

form a computational service set-up request message comprising at least one negotiated computational service parameter; and

transmit the computational service set-up request message on a second computer network;

~~The communication system of claim 35,~~ wherein:

the first network device is further configured to receive the computational service set-up request message from the second network device and to implement the at least one negotiated computational service parameter received in the computational service set-up request message on the computational service engine so that the computational service engine applies at least one computational service to packets on the first communication link.

37.   (original)   The communication system of claim 36, where:

the computational service engine is configured to receive compressed packets on the first communication link from the at least one remote client device, and responsive thereto, decompress the received packets and transmit the decompressed packets on the second communication link to the second network device; and

the computational service engine is further configured to receive uncompressed packets

on the second communication link from the second network device, and responsive thereto, compress the received packets and transmit the compressed packets on the first communication link to the remote client device.

38.   (cancelled without prejudice) The communication system of claim 35, wherein the first communication link comprises a communication path on a public switched telephone network and the second communication link comprises a communication path on a packet switched network.

39.   (cancelled without prejudice) The communication system of claim 35, wherein the point-to-point communication link comprises a tunnel communication link.

40.   (cancelled without prejudice) The communication system of claim 35, wherein the first network device comprises a tunnel initiator network device, and the second network device comprises a tunnel endpoint network device.

41.   (cancelled without prejudice) The communication system of claim 35, wherein the computational service comprises a computationally intensive service.

42.   (cancelled without prejudice) The communication system of claim 41, wherein the computationally intensive service comprises a compression service or an encryption service.